LECTURES,

UPON THE

HEART,
LUNGS,
PERICARDIUM,
PLEURA,

ASPERA ARTERIA,
MEMBRANA INTERSEPIENS, or MEDIASTINUM.

Together with the DIAPHRAGM,

INTERSPERSED WITH

A Variety of PRACTICAL REMARKS.

By H. MASON, Surgeon.

Nulla enim re magis, quam exemplo docemur.

The above LECTURES were lately delivered at the SURGEONS THEATRE.

READING:

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TO

Mr. GRINDALL,

Senior Surgeon to the *London Hoſpital*,

A

Member of the Company of *Surgeons* of *London*,

AND

Fellow of the *Royal Society*.

SIR,

I Am induced to addreſs the following LECTURES to you, from the Knowledge I have ſome Years had of your Abilities in Surgery; as alſo, from the favourable Cha-

racter, you was pleaſed to inform me, the late Mr. GIRLE and Mr. NOURSE gave you of them, when they were read at the SURGEONS THEATRE.

I am, with the greateſt Sincerity and Reſpect,

Your moſt obedient,

Humble Servant,

HENRY MASON.

The Introduction.

ANATOMY, when reſtricted to Surgery, is that art, which teaches the ſituation, figure, connexions, fabrick, actions, and uſes of the ſeveral parts of the human body.

The intent and ends of this ſcience are various: an admiration of one of the nobleſt works of the creator: a preſervation of our health, as nothing can lead us more immediately to a knowledge of the means of preſerving it, or reſtoring it, when impaired by diſeaſes, than a true knowledge of the ſtructure of that frame which is injured by them.

Can a ſurgeon, who is unacquainted with the human frame, make, for inſtance, a deep inciſion into any part of the human body, without running a riſque of opening ſome conſiderable artery, or wounding ſome nerve?

Is it not a manifeſt expoſing of the patient to terrible accidents, to bleed him, without knowing the parts adjacent to the vein we are about to open?

Unleſs he is well acquainted with the ſituation of the parts from anatomy, he will be always trembling, either with a vain fear, or elſe with a raſh aſſurance he will deſpiſe the danger of which he is ignorant.

Every chirurgical operation, therefore, proves how indiſpenſably neceſſary the knowledge of the parts of the human body is to Surgeons; and that flouriſhing ſtate of ſurgery we now ſee it in, is principally owing to thoſe beautiful diſcoveries with which anatomy has been lately enriched.

The want of this *index magneticus* (for as the needle is to a mariner, that is anatomy to a Surgeon) will in no inſtances be more felt by a Surgeon, than in giving his teſtimony in a court of judicature upon the untimely death of perſons he ſhall be appointed to examine; and particularly in caſes of wounds, for if the part is found to have loſt its uſe after the wound is healed, and as the judge uſually inflicts a penalty proportionable to the damage the patient ſuſtains, it is for this reaſon the council gene-

rally

rally uſe all the art they are maſters of to throw moſt of the ill conſequences upon the neglect or miſmanagement of the ſurgeon; therefore the ill effects which naturally follow ſome wounds, though ever ſo ſkillfully treated, ſhould be declared very early, and which can be deduced only from a knowledge of the anatomy, and injured functions of the parts wounded.

But one who is acquainted from anatomy or phyſiology with the uſes of the parts, as far as they are at preſent known, will determine the conſequences or effects of the wound as ſoon as the parts affected are known.

A maid-ſervant fell down with a glaſs mug in her hand, and wounded her arm betwixt the carpus and cubitus; a profuſe hæmorrhage alſo followed, from a diviſion of the artery running under the flexor carpi ulnaris muſcle: the hæmorrhage was happily reſtrained by compreſſing the trunk of the artery againſt the os humeri in the upper part of the arm; but then the patient complained of a numbneſs in her little finger, and in the middle of the next finger, which the ſurgeon judged to ariſe from the compreſſure of the artery; but being confirmed in my opinion by the accurate tables of Euſtachius, I boldly affirmed that the nerve was divided which goes to the little finger, and

to the middle of the next adjacent finger, and that therefore this complaint was irremediable. The event demonſtrated the truth of my aſſertion: for after the cure was compleated, at my requeſt, ſhe frequently put her finger into the flame of a candle, without feeling the leaſt pain.——*Vid. Van Swieten Comment. in Aphor. Boerhavii. Vol.* 1.

Another important end anatomy ſerves, is, the determining the cauſe of the death of perſons dying of natural diſeaſes, from a ſubſequent diſſection of the body——This may be called morbid anatomy.----Hereby we are ſhown the difference between the diſeaſed and healthy ſtate of the parts; and the latent cauſes of multitude of diſeaſes have been long ſince diſcovered by means of theſe diſſections, which otherwiſe we never could have known. Yet, there is here ſome caution neceſſary; for the dead body only ſhews us what its ſtate was at the time of death, and many changes will be found made in it by the diſeaſe, which, however they may be the effects of the diſeaſe, would be very improperly reckoned to be the cauſe of it.

The knowledge of the real cauſes of a diſeaſe, is the firſt rational ſtep towards its cure; and without the aſſiſtance of diſſections, how was the world to have known that the æſophogus

could

could have been burſt in a violent fit of vomiting, that the ſpleen growing to an immenſe ſize could have fallen into the pelvis by an elongation of its connecting veſſels, or have been informed of the nature of an empiema, a cataract, a hernia, and many others.

They are much miſtaken, ſays Baglivi, who think they can cure diſeaſes happily becauſe they are maſters of the Theory. They ought to have much higher things in view. They muſt diſſect the bodies of thoſe who die of diſtempers, and *foul their fingers*, to the end they may find out the ſeat of the complaint, the cauſe and iſſue of antecedent ſymptoms.

The ancients were ſo well convinced of the neceſſity of this knowledge, and to take, as they thought, the beſt method of attaining it, procured criminals out of priſon, and diſſecting them alive, contemplated while they were even breathing the parts which nature before had concealed, conſidering their poſition, colour, ſize, &c. for, ſay they, as various diſorders attack the internal parts, they thought no perſon could apply proper remedies to thoſe parts, which he was ignorant of.

The anatomical obſervations likewiſe made upon brutes have not only given great light to thoſe

thoſe made upon human bodies, but are exactly of a piece with them, nay, ſo certain and conſtant is that mutual analogy, that the ſtructure of the viſcera, and an infinity of other things have been diſcovered to the great happineſs of the age we live in.

Without theſe neither would Herophilus have diſcovered the lacteal veſſels in kids; Euſtachius and Pecquet their receptaculum chili and thoracic duct in the horſe and dog, nor Harvey his celebrated circulation of the blood. Add to theſe that the inſpections of carcaſes by prieſts in their daily ſacrifices; the cuſtom of embalming and opening the dead, as alſo dreſſing of carcaſes by the butcher, each afforded ſome knowledge of the anatomical ſtructure of ſound bodies, as well as the immediate and abſtruſe cauſes of health, ſickneſs, and death.

All this could hardly be done for many ages together, without frequently detecting the latent cauſes of the moſt ſevere diſeaſes as well as the ſtructure and ſituation of the parts; and hence the firſt foundation of practical anatomy.

Frequent and deſtructive war furniſhed opportunies of diſcovering many of the muſcles

and

and larger veſſels, with the articulation of the bones, to the naked eye in the yet living ſubject; inſomuch that ſome have attempted to extract a ſyſtem of anatomy from Homer, who has in reality writ hiſtories of wounds ſkilfully and anatomically ſtated

We have been taught alſo from practical anatomy that diſeaſes frequently change the natural ſituations of the viſcera, and this we are aſſured of from the moſt certain obſervations. The poſition of the ſtomach eſpecially has been obſerved to be ſurprizingly perverted together with the other viſcera of the abdomen, in the body of a woman after frequent vomitings. (*Mem. acad.* 1716, *page* 238.) And it ſeems very probable, that the viſcera are thus even frequently diſplaced, ſince, ſays Van Swieten, I have ſeveral times made the like obſervation, in the ſubjects which I either diſſected myſelf, or have ſeen diſſected by others. I have ſeen the ſpleen prolapſed into the pelvis, the bottom of the ſtomach continued below the navel; and have alſo ſeen that part of the colon which lies under the ſtomach ſo reflected thence as to form an arch below the navel, the convex part of which was towards the pelvis, and its concavity towards the ſtomach.

The

The advantages which Surgery particularly derives from Anatomy being very evident, I ſhall next proceed to what I intend in the following lectures, which is to conſider thoſe bowels placed in the cavity of the Thorax.

PRÆLECTIONES

We are well aſſured that the cellular membrane extends almoſt into every part of the body, and acquires different denominations, according to the different matter which it contains. In thoſe parts of the body where this membrane is thinneſt, its cells, being empty of oil or fat, eſcapes the eye, and is termed ſimply celluloſa—We ſhould conſider, that not only all the muſcles and tendons are inveſted with ſuch a cellular membrane, but that even every muſcular fibre, as far as the eye and patient hand of the moſt acute and dexterous anatomiſt has been able to penetrate, is alſo inveſted with the ſame; almoſt every veſſel in the body runs in or through ſuch a cellular ſubſtance, which in part conſtitutes the fabric of the veſſels and viſcera themſelves.——*For a beautiful and extenſive account of this membrane, ſee* Scobingerus de dignitate telæ celluloſæ in corpore humano.

To return to the pleura——We meet with, in the celebrated Dr. Haller, a remarkable caſe of an hydrops ſaccatus pleuræ, or an incyſted dropſy of this membrane: upon opening the thorax, to the no ſmall aſtoniſhment of the perſons preſent, there were no lungs (he ſays) to be found, but only a bag full of a green watery liquor, which, upon a further enquiry, was obſerved to have been extravaſated between the intercoſtal muſcles and the pleura, and that this

membrane, the uſe of which is to line the inſide of the ribs, was ſeparated from them in ſuch a manner as to form a bag as large as the whole cavity of the breaſt. Hence the left lobe of the lungs was ſo much compreſſed, as to be rendered thinner than one's hand, and the cavity in which it was lodged no larger than a glove. This (he obſerves) is a very rare caſe, and ſhews, that an incyſted dropſy may be produced in the thorax, from water collected in the cells of the pleura.

The ſame ingenious gentleman, from ſome diſſections of perſons dying of a pleuriſy, is of opinion, that the pleura is much ſeldomer the ſeat of the diſeaſe, than is ſuppoſed; in thoſe he opened, the pleura was perfectly ſound, the ſeat of the abſceſs being in that part of the lungs which is contiguous to the diaphragm. This obſervation, he ſays, he could confirm by innumerable inſtances of the ſame kind. To this he adds, that the ſpitting in pleuretic patients, owing to the inflammation, is eaſily underſtood, if the ſeat of the diſeaſe is granted to be in the lungs; ſeeing, by the inflammation, part of the obſtructing matter will make its way through the relaxed, exhaling, or mucous veſſels into the bronchia. But how that matter can paſs from the pleura to the aſpera arteria, while the lungs remain ſound, he leaves to thoſe who are of that opinion to explain.

And

And from the rareneſs of the caſe of an inflammation of the pleura proving mortal, or producing that pus which is collected in the empiema, he would adviſe thoſe who have the treatment of pleuretic people, to ſuſpect the cauſe of that diſeaſe to be rather an inflammation of the lungs than of the pleura, and to have immediate recourſe to the moſt powerful remedies.—See his Pathological obſervations.

In ſupport of this opinion of Dr. Haller's, I ſhall bring the teſtimony of Peter Servius, from Triller's valuable treatiſe de Pleuritide, who, after opening three hundred perſons deceaſed of pleuriſies at Rome, always found one lobe of the lungs corrupted and diſtended with a putrid matter, but the pleura appeared not in the leaſt affected.

Mr. Cheſelden likewiſe ever found this to be the caſe, (he ſays) in opening ſuch who were ſuppoſed to have died of pleuriſies.

It is no novel opinion, that the lungs are the parts affected in a pleuriſy—for Aurelianus reckons up a number of antient phyſicians, who defended this ſentiment.

But to the mediaſtinum, the uſes of this partition are to cut off all communication between the two cavities, by which, if one lobe

of the lungs is ulcerated, the other may not be immediately affected; that matter, water, or any thing elſe contained in one part of the thorax might not affect the other, and that, in caſe of a wound in one ſide of the thorax, reſpiration might be kept up in the other, and the perſon not immediately ſuffocated. Another general uſe it has, is, to ſupport the heart with its pericardium as well as the diaphragm, by means of which, the ſtomach, the liver, and the other viſcera of the abdomen attached thereto, cannot, in drawing down the diaphragm too forcibly towards the inferior parts, interrupt the action of the heart and reſpiration.

It may here be queſtioned, whether a latent abſceſs under the ſternum cannot have a diſcharge of its matter by an opening through the ſternum, leſt the pericardium and heart ſhould be corroded by the confined and putrid matter?

Examples are not wanting in writers too of great credit, of the trepan's having been ſucceſsfully applied over this part, in order to give vent to a collection of matter or water underneath.

Galen gives a remarkable caſe of a lad, who received a blow upon his ſternum, and being negli-

negligently treated, that part of the ſternum appeared afterwards corrupted by a ſphacelus. Galen, truſting to anatomy in which he was ſo well ſkilled, cut out the carious part of the ſternum, and tells us, he was able to ſee the naked heart, whoſe pericardium was eaten through, under the carious part of the bone; yet this lad was cured in a ſhort time.

We are aſſured, by the celebrated Van Swieten, that he has ſeen matter, after a ſuppuration in the thorax, making its way through the ſternum, which ſhews ſuch a method of cure is poſſible.

We may therefore reaſonably conclude, that when there are evident ſigns demonſtrating a latent empiema ſeated beneath the ſternum, an opening into it may be very ſafely attempted; notwithſtanding the aſſurance given us by Dionis in his anatomy, that he ſaw the ſternum unſucceſsfully trepanned in a wounded gentleman, who afterwards expired: for it does not in that caſe appear that his death could be aſcribed to the operation, but rather to his wound; and enough has been ſaid to ſhew that people have ſurvived an opening made through their breaſt-bone, and as a further confirmation, ſhall produce one more inſtance from Haller's Prælectiones Academicæ, where we are told, that a certain Divine at Amſterdam

had

had the trepan ſucceſsfully applied to this part, and who was by this means freed from a great quantity of matter, and the heart was thus left ſo naked, that by applying a looking-glaſs oppoſite to the wound, he could ſee his own heart beating, which he appeared to take ſome pleaſure in, he being a man of uncommon taſte, and the author of a celebrated treatiſe, denying the exiſtence of devils.

PRÆLECTIO SECUNDA.

HAVING gone through the deſcription of the pleura with its reduplicated plates compoſing the mediaſtinum, I ſhall next proceed to the examination of the heart, with its capſula the pericardium.

The pericardium is a membranous ſack of a pretty firm texture, which immediately includes the heart, and is placed between the two laminæ of the mediaſtinum.

The capacity of the pericardium is equal to the ſize of the heart, and is not as large again, as ſome anatomiſts have imagined; and if it ſeems larger than neceſſary to cover the heart

heart when a body is opened, it is wholly owing to the heart's emptying itſelf at the moment of death, not only of the blood contained in its ventricles, but alſo that of the coronary arteries, by which means, its volume is prodigiouſly diminiſhed—This is an obſervation of Lieutaud's.

The pericardium is compoſed of two membranes, and of a cellular web which joins them together: the outward membrane is tendinous and very compact, and the inward is thin and poliſhed, being moiſtened on all ſides by a watery vapour. It muſt be obſerved, that not only this cavity, but the interſtices in the abdomen, thorax, and all other cavities of the living animal, are repleniſhed with moiſt vapours diſcharged by exhaling veſſels—the exiſtence of which, in the ſuperficies of the heart and its auricles, may be proved by a ſimilar tranſudation of water or fiſh-glue injected into the large arteries: with this moiſture, the heart will be lubricated, and that friction prevented, which might inflame and occaſion its adheſion to the pericardium. But if theſe exhaling arteries diſcharge more plentifully than the veins abſorb, this fluid will be accumulated to the quantity in which we often find it. By this means, when the abſorbing power declines in chronical diſorders, there is frequently produced a dropſy of the pericardium, and in

which

which caſe it has been found diſtended with ſeveral pounds of liquor.

We may be ſenſible how neceſſary this moiſture is to lubricate and ſeparate the viſcera, and eſpecially the heart, from the hiſtories given us by Peyerus, in which the patients were troubled with the moſt violent oppreſſions and palpitations, becauſe for want of this moiſture the heart was found dry, and adhering to the pericardium.

The tendinous part of this bag has nine apertures or holes, as well for the paſſage of thoſe veſſels which enter into its cavity, as thoſe which iſſue out of it; that is, two for the venæ cavæ, four for the pulmonary veins, one for the trunk of the aorta, and two for the pulmonary arteries.

The connexions of the pericardium are, with the principal veſſels, juſt now mentioned; it is alſo adherent, in a great part of its extent, to the aponeurotic portion of the diaphragm, ſo as to be inſeparable without laceration; by which means, it ſuſtains that broad muſcle with the ſeveral viſcera connected pendulous to it, ſo that the diaphragm cannot by their weight be drawn down too low in the abdomen in our erect poſture.

It has been ſaid, that this capſule has ſometimes been found wanting.——Columbus tells us that he opened a ſtudent who died of a fit in the univerſity of Rome, and that in this ſubject he could find no pericardium, but it ſeems more probable, that from a preceding inflammation, it had united itſelf ſo cloſely with the heart as to have deceived him: certain it is, that the coalition of this membrane is much more probable, than the entire want of it.

Ruyſch kept by him the heart of a man who laboured under a continual fever, with an intolerable pain about the fore-part of his breaſt; but the outer ſurface of this heart was altogether rough or unequal, from the pericardium being grown to its ſurface.

Lower produces a like inſtance of its adhering every where ſo cloſely to the heart, that he found it difficult to ſeparate it with his fingers.

It is probable, inflammations of the mediaſtinum and pericardium happen oftener than is commonly believed; for the cauſes producing them may very powerfully act upon theſe parts, namely, the cold air, or the drinking of large draughts of cold liquors by perſons much heated; but the pericardium is ſeated betwixt the lungs, by which it is almoſt every way ſurrounded, ſo that the cold air inſpired is, by the

dilated lungs, applied to the contiguous mediaſtinum and pericardium, and the æſophagus, tranſmitting cold drinks, go along betwixt the two receding plates of the mediaſtinum, and paſſes the diaphragm behind the pericardium; the principal ſigns of this malady are ſuch cauſes already mentioned, and a great heat felt in the midſt of the thorax; to which add a great diſturbance of the pulſe, and fainting fits, when the inflammation has ſpread to the pericardium.—If a ſuppuration ſhall be formed in the pericardium, it may penetrate the cavity of that bag, and lie round the ſurface of the heart.-----Columbus (*de re anatomica*, *lib.* xv. *p.* 267.) found the heart every way ſurrounded by an abſceſs, by which it was almoſt conſumed.

An inflammation of the mediaſtinum is very fairly confirmed by the obſervations of Avenzoar, who writes that himſelf laboured under this malady—Upon his firſt diſorder, which happened in a journey, he felt a pain in that part, which increaſed with a cough; he found his pulſe very hard and his fever very acute. The fourth night, he took away a pint of blood; his ſymptoms were but little relieved; but in the night, and while aſleep, the bandage of the arm came off; upon waking, he found the bed ſwimming with blood, and ſoon after recovered. The ſymptoms in this diſeaſe are generally,

generally, he ſays, a continual ſucceſſive cough, a tenſive pain lengthways, a difficulty in breathing, an acute fever, great thirſt, and a hard unequal pulſe.

This phyſician not only takes notice of an abſceſs in the mediaſtinum, but in the pericardium likewiſe.

Salius Diverſus, who has withgood judgment given us an account of ſeveral diſtempers, overlooked by the generality of writers, deſcribes this diſorder in a different chapter by itſelf, and ſays, it had been taken notice of by no practical author before him. His deſcription of the ſymptoms, which follow upon an inflammation here, is very exact and particular; and becauſe the caſe is one pretty much out of the way, tho' without diſpute, ſuch as does often occur in practice, and may be eaſily diſcerned, if well attended to, I ſhall juſt give a ſketch of what he obſerves, (which indeed anſwers to what I have recited from Avenzoar) from the learned Dr. Friend's hiſtory of phyſic—There is (ſays he) an acute fever, inquietude, thirſt, breathing thick and quick, great heat in the thorax, little pain except at the ſternum, a cough always with it, and a hard pulſe. When the pericardium was inflamed too, there was a more intenſe heat, and a frequent ſyncope; in one word, all the ſymptoms worſe. And for a proof of what he aſſerts, he gives the caſe of

one, who died on the ninth day after ſome fits of the ſyncope: where, upon diſſection, there appeared an inflammation of the interſepient membranes, as he calls them, and ſome part of the pericardium. And this diſtemper, I don't queſtion, happens oftener than our practitioners commonly are aware of. He confeſſes that he gave a more diligent attention to all theſe circumſtances, becauſe, being then young and compleating his ſtudies under very eminent profeſſors, he had ſeen a man of quality labouring under the above diſtemper, which had all the ſymptoms before enumerated, and who, beyond all expectation, expired, when every thing ſeemed to change for the better; but he was ſeveral times troubled with fainting fits before his death. But as the phyſicians were here doubtful of the malady, and his friends ſuſpected poiſon had been given him, they deſired an enquiry to be made after the cauſe. Upon opening the thorax, an inflammatory ſwelling of conſiderable bulk was found in the mediaſtinum; and an inflammation had in part ſeized upon the pericardium. Nor was there any other apparent cauſe of death found in the body of the deceaſed.

Columbus takes notice of collections of matter in the mediaſtinum, and which he and Barbette order to be taken out by trepanning the ſternum.

As

As a further and more convincing proof of what has been remarked, a gentleman, juſtly eſteemed (ſays Dr. Friend) for his long experience and ſound judgment in every thing relating to ſurgery, informed him, that abſceſſes of the mediaſtinum particularly happened in venereal diſtempers, and that, in ſuch caſes, he has frequently uſed the trepan with great ſucceſs. We may from hence be ſatisfied, how little ground there is for that hint of Parey, where he ſeems to think this operation a ridiculous attempt.

Since the treatiſe of Peter Salius is rarely to be found, you may read the chapter of Schenkius that contains the whole, " de inflamma-
" tione membranarum interſepientium et pe-
" ricardii—de tabe ex affectu pericardii—
" de tumoribus diaphragmatis."

Of the HEART.

The heart is a muſcular body, ſituated in the cavity of the thorax, being placed nearly in a tranſverſe or horizontal poſture, with its baſis in the right ſide of the thorax, and its apex in the left, while its broadeſt and flat ſide, from the baſis to the apex lies inclined and ſupported on the diaphragm, to the tendinous or middle part of which it is firmly connected by the vena cava, and right venous

ſinus

ſinus below; and above, in the thorax, it is connected within the duplicature of the mediaſtinum, and lodged betwixt the ſoft lobes of the lungs; by all which means, it avoids too great a preſſure on any ſide, and is moſt commodiouſly adapted to receive the blood from, and propel it into all parts of the body.

This is the true poſition of the heart in the human body.—The figures in many of our modern anatomiſts are erroneous in this reſpect—But the figures of Veſalius, Euſtachius, and Ruyſch, ſhew the heart in its natural poſture. From what has been ſaid here, we may reſolve the queſtion, why over-eating cauſes a palpitation of the heart; for ſince the heart is only ſeparated from the ſtomach by the diaphragm, when the ſtomach is over diſtended, it wlll force up the diaphragm, and preſs upon the heart. Hence alſo we may ſee how the heart comes to be preſſed up ſo high in the thorax of thoſe who die of a dropſy in the abdomen, and why it is forced ſo far down in the abdomen of thoſe who die of a dropſy in the thorax; becauſe the diaphragm, to which the heart is connected by its pericardium, is forced either way by the contained water.

At the baſis of the heart are ſituated two muſcular bags, one towards the right ventricle,

cle, the other towards the left, and joined together by an inner ſeptum, much in the ſame manner with the ventricles, one of them being called the right auricle, the other the left. They are very uneven on the inſide, but ſmoother on the outſide, and terminate in a narrow flat indented edge, repreſenting in ſome meaſure the ear of a dog; they open into the orifices of each ventricle, called by the name of the auricular orifices, and they are tendinous at their opening, in the ſame manner as the ventricles.

The right auricle is larger than the left, and it joins the right ventricle by a common tendinous opening, juſt taken notice of. It has two other openings united into one, and formed by two large veins which meet and terminate there almoſt in a direct line, called vena cava ſuperior and inferior.

In opening a dog, not long ſince, at the requeſt of a lady, I found the pericardium amazingly ſtretched with blood, ſo as to fill half the ſpace of the thorax, with an aperture at the meeting of the two venæ cavæ, large enough to admit the end of a finger. In Bonetus's Sepulchret. Anatomic. we meet with two or three inſtances of ruptures in this vein in the human ſubject.—*Tom.* 1. *p.* 881. *ſect.* xi. *de morte repentina.*—*Obſ.* 1. *Mors ſubita ob effuſum*

fuſum ſanguinem in dextrum cordis ſinum et pericardium, á ruptura venæ cavæ.—Obſ. 2. Cuidam morte concidente, fodiendi labore fatigato, vena cava prope cor diſrupta, ſanguine inundavit viſcera.

The whole inner ſurface of the right auricle is uneven, by reaſon of a great number of prominent lines which run acroſs the ſides of it. In the interſtices between theſe lines, the ſides of the auricle are very thin and almoſt tranſparent. There is an obſervation in Dionis, where he found this auricle ſo far dilated, that it was equal to the head of a new-born infant.

The left auricle is in the human body a kind of muſcular bag, or reſervoir of a pretty conſiderable thickneſs, into which the four pulmonary veins open. The whole common cavity of this auricle is ſmaller in an adult ſubject, than that of the right.

The fleſhy or muſcular fibres of which the heart is made up, are diſpoſed in ſo ſingular a manner, that their courſe will be much eaſier underſtood by ſeeing than deſcribing them.

The heart is divided by a ſeptum, which runs between its edges into two cavities called ventriculi, one of which is thick and ſolid, the

other

other thin and ſoft: this latter is termed the right or anterior ventricle, the other the left or poſterior ventricle.

Lower, in his treatiſe *de corde*, tells us, that in a perſon who died of a conſumption, and was ſubject to fainting fits in his life time, he found both the ventricles of the heart nearly cloſed up, particularly the right, by a fleſhy ſubſtance, ſo as ſcarce to leave room for the admiſſion of a gooſe-quill.

We had lately a melancholly inſtance of a rupture, in the ſide of the right ventricle; and which occaſioned the death of our late King.

Each ventricle opens at the baſis by two orifices, one of which anſwers to the auricles, the other to the mouth of a large artery, therefore one of them may be termed the auricular orifice, the other the arterial orifice. The right ventricle opens into the right auricle, and into the trunk of the pulmonary artery, the left into the left auricle, and into the great trunk of the aorta.

At the edges of theſe orifices are found ſeveral moveable pelliculæ called valves, of which ſome are turned inward towards the cavity of the ventricles called tricuſpides, others are turned towards the great veſſels called ſemilunares.

The inner ſurface of the ventricles is very uneven, many eminences and cavities being obſervable therein; the moſt conſiderable eminences are thick fleſhy productions, called columnæ, to whoſe extremities are faſtened ſeveral tendinous chords, the other ends of which are joined to the valvulæ tricuſpides.

The valves at the orifices of the ventricles are of two kinds, one kind allows the blood to enter the heart, and hinders it from going out the ſame way, the other kind allows the blood to go out of the heart, but hinders it from returning. The valves of the firſt kind terminate the auriculæ, and thoſe of the ſecond lie in the openings of the great arteries.

The tricuſpidal valves of the right ventricle are fixed to its auricular orifice, and turned inward toward the cavity of the ventricle. They are three triangular productions, very ſmooth and poliſhed on that ſide which is turned towards the auricle, and on the ſide next the cavity of the ventricle, they have ſeveral membranous and tendinous expanſions.

The valves of the auricular orifice of the left ventricle are of the ſame ſhape and ſtructure, but are only two in number, and from ſome ſmall reſemblance to a mitre, they have been named mitrales. Theſe five valves are very thin, and faſtened by ſeveral tendinous ropes to the fleſhy columnæ of the ventricles. The

The ſemilunar valves are ſix in number, three belonging to each ventricle, ſituated at the mouths of the great arteries, and may properly be called valvulæ arteriales. The great artery that goes out from the left ventricle is termed aorta; as it goes out, it turns a little toward the right hand, and then bends obliquely backward to form what is called aorta deſcendens.

It is at the arch or curvature of this great veſſel, that we oftner meet with the true aneuriſm than elſewhere; though Dr. Haller, in his pathological obſervations, cites an inſtance of one in the carotid artery, which reached from the ſubclavian to the diviſion of the two branches of the carotid, and the ſurgeon, miſled by a kind of undulation, was preparing to lay it open.

It appears from anatomy, that the arteries, eſpecially the larger, have pretty thick coats, partly cellular and partly muſcular; ſo that when the ſtrength of the ſides of an artery is diminiſhed by any cauſe, the conſequence will be, that it will be dilated moſt in its injured part, ſo as to change the natural figure of the veſſel, by diſtending its weakeſt part into a ſacculus.

We find, upon examining the hiſtories of this diſeaſe, that they have for the moſt part

aroſe from blows and contuſions about the breaſt, ſome again from an overſtretching of their coats in violent ſtraining, others from eroſion.—Examples, where they have ſprung from each of theſe cauſes, we meet with in Lanciſius.

Ruyſch has an obſervation of one at the curvature of the aorta, which was ſo large as to equal a common cuſhion.

It is found that in proceſs of time the blood in theſe tumours begins to corrupt and become ſo acrimonious, as to corrode the adjacent ſoft parts, and does not even ſpare the compact bones. And Ruyſch obſerves in his caſe, that almoſt all the ribs and ſternum of the patient were reduced nearly to nothing. —Sometimes theſe poor unhappy patients expire hereby in a moment. We read of a ſoldier, in the Academ. des Sciences, who ſuſtained a large aneuriſm of this kind for ſome time, when a flux of blood ſuddenly burſt forth from his mouth, of which he expired in a minute. Upon opening the body it was found, that the aneuriſm adhered to the trachea, into which it had an opening betwixt the ſixth and ſeventh cartilage, by which the blood eſcaped into the windpipe and out of the mouth.

Surgeons ſhould be very careful to diſtinguiſh well this kind of tumour from others, ſince

ſince we are taught, by many obſervations, that ſeveral, in other reſpects ſkilful men, have imprudently deſtroyed the patient by opening them.—That it is an aneuriſm, may be collected—from the fore-mentioned cauſes having preceded, from the tumor being ſeated in a part, where we know from anatomy, there is ſome large artery ſeated, but more eſpecially when it has a manifeſt pulſation, and if the tumor diminiſhes by a ſlight preſſure, and returns again when the preſſure is removed.

As aneuriſms in the internal parts of the body are inacceſſible, all that can be done for the patient is, to abate the impetus of the blood's motion by a thin diet, and repeated bleeding, by which means, the diſorder may be prevented from increaſing as much as poſſible, and the patient at the ſame time be ordered to refrain from all commotions of body and mind.

The trunk of the artery, which goes out from the right ventricle, is called arteria pulmonaris.—This I ſhall leave to the particular hiſtory of the lungs.

Beſides the great common veſſels, the heart has veſſels peculiar to itſelf, called the coronary arteries and veins, ſo named from their crowning in ſome meaſure the baſis of the heart,

heart, they go out from the beginning of the aorta, and ſend numerous ramifications to the ſubſtance of the heart.

This organ, with the parts belonging to it, are the principal inſtruments of the circulation of the blood.

The heart is made up of a ſubſtance capable of contraction and dilatation; when the fleſhy fibres of the ventricles are contracted, the two cavities are leſſened in an equal and direct manner, not by any contorſion or twiſting, as ſome have imagined; and from conſidering its ſtructure, we muſt ſee, that it tends to make an even and uniform contraction, more according to the breadth or thickneſs, than according to the length of the heart, becauſe the number of fibres, ſituated tranſverſely, is much greater than the number of longitudinal fibres.

The fleſhy fibres thus contracted do the office of ſuckers, by preſſing upon the blood contained in the ventricles, which blood, being thus forced towards the baſis of the heart, preſſes the tricuſpidal valves againſt each other, opens the ſemilunares, and ruſhes through the arteries and their ramifications, as through ſo many elaſtic tubes.

The

The blood thus puſhed on by the contraction of the ventricles, and afterwards preſſed by the elaſtic arteries, enters the capillary veſſels, and is from thence forced to return by the veins to the auricles, which, like porches or antichambers, receive and lodge the blood returned by the veins, during the time of a new contraction.

This contraction is called the ſyſtole of the heart.

The contraction or ſyſtole, ceaſing immediately by the relaxation of the fleſhy fibres, and in that time, the auricles which contain the venal blood being contracted, force the blood through the tricuſpidal valves into the ventricles, the ſides of which are thereby dilated, and their cavities enlarged.

This dilatation is termed the diaſtole of the heart.

In this manner does the heart, by the alternate ſyſtole and diaſtole of its ventricles and auricles, puſh the blood through the arteries to all parts of the body. Therefore the authors of the hypotheſis, which makes the right ventricle to contract itſelf before the left, have been deceived, as Haller has clearly evinced, by ſome experiments you will find in a late ingenious

ingenious treatiſe of his ‘ Sur le Mouvement ‘ du ſang.’

Wounds, which penetrate the cavities of this bowel, or by which any of the large blood veſſels iſſuing out of it are opened, are conſidered as abſolutely mortal.

It is to be remarked in wounds of the right ventricle of the heart, that the lungs continue to act, and by their dilatation, give an eaſy paſſage to the blood to enter into them from that ventricle; hence therefore there will not be ſo much blood expelled by the wound during the ſyſtole of the heart, becauſe of the free paſſage which it meets with into the lungs, whence again ſuch a wound will have the greater opportunity to unite and heal.

But wounds of the left ventricle ſeem to be much more dangerous, ſince, if it be not totally perforated, the wound will of neceſſity be continually enlarging by the very ſtrong power with which the left ventricle contracts, and which greatly exeeeds the force of the right ventricle, in order to protrude its contained blood into the ſtrongly reſiſting aorta, ſo as to dilate the ſame and all its branches throughout the whole body.

However,

However, we ought never to deſpair even in the moſt dangerous wounds. For there are ſome obſervations which ſhew, that men have often lived a conſiderable time after wounds of the heart, eſpecially when the right ventricle only has been perforated. Even ſome obſervations teach us, that wounds of the heart are curable. *See Bartholine's Centur.* i. *Hiſtor.* 77. ---*Schenckii Obſer. Med. Rar. p.* 275.---*Saviard and others.*

For while the patient continues only in a very weak and languid ſtate, we may have ſeen in practice, I dare ſay, that wounds have been healed, which no one would have thought poſſible; and the likelieſt method to ſucceed is to keep the patient very quiet, and to avoid exciting the circulation by any ſtimulus, eſpecially thoſe called cordials, which ſhould be carefully avoided; the life of the patient may poſſibly be preſerved, and the wound healed.

For nobody would believe with how ſmall a quantity and motion of the blood a perſon may live, who is not acquainted with the inſtances given us by practical writers in the caſes of wounds, and in the miſcarriages of women.

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There is a diſorder that pretty often occurs, though not much remarked, nor well deſcribed, which is, *an aneuriſm of the heart*, or a preternatural enlargement of its cavities; for while the heart's force exceeds the reſiſtance of the arteries, it continues of the ſame dimenſions, but when the reſiſtance of theſe laſt from

being

being grown rigid and boney exceeds the force of the heart, its cavities then enlarge.

Practical anatomy furniſhes us with many obſervations, teaching that the heart is thus frequently diſtended: we meet with one in the philoſophical tranſactions, where the left ventricle was found three times larger than the right.-----Fernelius, (in his Pathologia *lib.* v. *cap.* 12.) gives an account of a very uncommon and ſurprizing caſe of this kind; where he ſays, the frequent concuſſions of the heart were ſo violent and ſtrong, as not only to luxate, but even to break ſome of the adjoining ribs.

Marchettis in his anatomy, tells us, that he found a heart ſo big, as to poſſeſs the whole thorax, and the ventricles of a prodigious extent, chiefly the right, that a natural ſized heart might be contained in it.

But among the rarer cauſes of this preternatural diſtenſion of its ventricles, we may reckon the air, which has been ſometimes found in the cavities of the heart, diſtending them immenſely.

In a woman, who died ſuddenly, Ruyſch found the heart of a ſtupendous magnitude, from the air, with which it was full, containing

ing ſcarce any blood, as appeared from entering the point of a knife into it, the heart ſuddenly ſubſiding, as if one had punctured a bladder full of air.

Morbid diſſections convince us, that in the heart have been found, inflammations—ſuppurations—eroſions.

I ſhall add to that of our late King an inſtance of this ſort, from the Academ. des Sciences—Where, upon opening the body of the Duke of Brunſwick, the heart was found eroded by ulcers, and the right ventricle appeared burſt, from ſuch an ulceration and eroſion.

Morand, in the ſame papers, furniſhes us with another more ſurprizing inſtance----Who, upon ſearching after the cauſe of ſudden death in the body of a nobleman, there appeared, upon ſlitting up the pericardium, a large maſs of congealed blood, and in the left ventricle, a perforation, which was equal to eight lines in length, and the fleſhy ſubſtance of the heart appeared ſo infirm, that the probe made its way through, in every part, by its own weight. ——The two foregoing extraordinary caſes we meet with, in the Acad. des Sciences for the year 1732, under the following title, *Sur*

Quelques

Quelques Accidens remarquables dans les Organes de la Circulation du Sang.

When the cauſe of a gangrene in the extremities of old people lies in the weakneſs of the heart, ſo as to be unable to propel the blood into the extremities, we may well deſpair of a cure.

In the following hiſtories, the powers of the heart ſeem to have been ſo weak, as not to be able to diſentangle the veſſels, which were folded together by the ſlighteſt preſſure that could be.

Tulpius records a remarkable caſe of an old dotard, who had long ſtruggled with weakneſs, and the heat of the parts ſo far extinguiſhed, that every the leaſt preſſure upon any part of the body was immediately followed with a gangrene; ſo that in a ſhort time every part about him was almoſt mortified before the poor miſerable wretch was actually dead.

The celebrated Van Swieten tells us, that he had ſeen himſelf a reſembling caſe in a woman of 90, whoſe extreme parts were not only mortified before ſhe died, but alſo the cheek which lay on the pillow while ſhe ſlept.

From

From polypous concretions, whether formed in the heart or in its greater veſſels, ariſe many irregular and terrible ſymptoms.

Sometimes they have been found lying looſe in the cavity of the heart----at other times they have been found adhering to the veſſels themſelves, and to the columnæ and auricles of the heart; of which there is a very remarkable one, both hiſtory and repreſentation, in Bartholine's Centuriæ.------Thoſe who are curious to know more of this matter, may conſult Malpighius's treatiſe of the polypus of the heart, who was the firſt (and ſince him Ruyſch) who threw any light upon this ſubject, which before his time was entirely in the dark.

There is but little hope of curing a confirmed polypus. All that can be aimed at, is, to dilute the blood, and ſo throw it into a ſtate moſt remote from concretion, *i. e.* to introduce by art that cachochymy which conſiſts in the blood's being too thin, to the end the polypus may not be increaſed by the appoſition of new matter, but by degrees be worn away by the conſtant attrition of the blood, which is every moment paſſing by it.

PRÆLECTIO TERTIA.

HAVING conſidered the heart with its pericardium, we come next to the deſcription of the lungs.

The bags of the pleura are exactly filled by the lungs, which are two large ſpungy bodies filling the whole cavity of the thorax, one being ſeated in the right ſide, the other in the left, parted by the mediaſtinum and heart, and of a figure anſwering to that of the cavity which contains them; that is, convex next the ribs, concave next the diaphragm, and irregularly flatted and depreſſed next the mediaſtinum and heart.

The right lung is larger than the left, anſwerable to that cavity of the breaſt, and to the obliquity of the mediaſtinum, and more frequently divided or half cut through into three diſtinct lobes or portions; but the left lung is not ſo often divided into three.

At the lower edge of the left lung there is an indented notch or ſinus, (and which Euſtachius

ſtachius has taken care to expreſs in his Tables) oppoſite to the apex of the heart, which is therefore never covered by that lung even in the ſtrongeſt inſpirations, and conſequently the apex of the heart may always ſtrike againſt the ribs, the lungs not ſurrounding the heart in the manner commonly taught.

The ſubſtance of the lungs is almoſt all ſpungy, being made up of an infinite number of membranous cells, and of different ſorts of veſſels ſpread among the cells, in innumerable ramifications.

This whole maſs is covered by a membrane reflected from each pleura. Betwixt the lungs and pleura is found a watery or ſerous vapour, of a coagulable nature, like that of the pericardium, which vapour tranſudes from the ſurface of the lungs and pleura, *(ſee the celebrated Kaau, de perſpirat. dicta Hippocrati per univerſum corpus anatomice illuſtrata)* and is ſometimes accumulated ſo as to form a dropſy of the thorax.

The chief veſſels of which the ſubſtance of the lungs is compoſed are the air veſſels and blood veſſels; the air veſſels make the chief part, and are termed bronchia, and which are branches or ramifications of a large canal, partly

wound or aperture in the windpipe, which he would ſtop with a ſpunge, and then he could ſpeak very well, but by opening the hole he loſt his voice. This accident aroſe from part of the windpipe being torn off by a bullet in battle, ſo that the lips of the wound could not be afterwards brought together without leaving a conſiderable aperture, yet he ſurvived the accident many years.

This laſt caſe brings to my remembrance a device I uſed in a wound of this part, which a gentlewoman under a diſcontent of mind had inflicted upon herſelf with a razor, juſt below the larynx, between the thyroide and cricoide cartilages, with a loſs of part of the ſubſtance of the latter; as there was here (beſides bringing the divided parts as near together as poſſible) another intention, that of contributing to reſtore the loſs of ſubſtance—I recollected Marchetti's contrivance in a fiſtula which penetrated the aſpera arteria, and which I ſhall give in his own words, " Multas ſanavi " fiſtulas colli, potiſſimum vero qua laboravit " adoleſcens quatuordecim annorum, in parte " ejuſdem anteriori, infra laryngem, oborto " primum ex contuſione tumore, cui a barbi- " tonſore ſanato, ſuperſtes fuit fiſtula inter " utrumque annulum aſperæ arteriæ, cum læ- " ſione utriuſque cartilaginis, ex qua ſpiritus ef- " flabatur." Having firſt prepared him (he ſays) " Deveni ad topica; et primo quidem quatuor

" integumenta dilatavi turunda ex ſpongia,
" deinde *ſcalpro abraſorio partes ipſas carti-*
" *lagineas utrinque læſas accurate abraſi*, tum
" filamenta arida ſupra eaſdem applicui; poſt
" modum unguento iridis, quod occaleſcere
" cœperat, in parte carnoſa attrivi. Tandem
" globulis ex filamentis, imbutis unguento ex
" tutia, cavitatem opplevi; atq; ſenſim et ſen-
" ſim imminutis globulis, cerato ex diachalci-
" tide, cum filamentis aridis cicatrice fiſtulam
" obduxi.—Vide Marchettis Obs. Medico.—
Chirurgicar. Ob. 37, p. 52.

In imitation of the above method I ſlightly (every other day) ſcratched the edges of the wound in the trachea with a ſcalpel, dreſſing it up with dry lint and a retentive bandage, going on thus for about three weeks, I had the pleaſure to ſee the opening contract apace, when my patient, in the abſence of her nurſe, and undeſirous of living, accompliſhed what ſhe had before miſcarried in, (the deſtroying herſelf) by giving herſelf a ſecond wound, and dividing the left carotid artery hereby depriving me of the expectation I reaſonably had of ſucceeding in the cure.

The ingenious Dr. Muzell, author of ſome medical and chirurgical caſes, which occurred to him in the Charité at Berlin, aſſures us, that he had ſeen the good effects of ſcarifica-

tion

tion in much the ſame manner, in many caſes, particularly ulcers of the velum palati, and fiſtulæ in perinæo——Patience and a conſtant repetition of the ſcarification is required; for it is difficult to touch all the parts with the lancet, and they do not heal, till they become raw and inflamed; he further ſays, that he once ſaw this method proſecuted with ſucceſs in a diſorder of the noſe, where there was a conſiderable aperture in the cartilaginous part of the left noſtril, which, after a long continuance of the ſcarification, was cured. He directs that the inciſions ſhould always be made as near as poſſible to each other, and to be repeated twice a day till the calloſities are gone, and equal granulations of fleſh appear.

Upon the facility with which even ſome of the moſt complicated wounds of the trachea arteria have been cured, bronchotomy has, both by the antients and moderns, been principally eſtabliſhed.

Sometimes extraneous bodies are ſo engaged in the æſophagus, that we can neither extract nor depreſs them. And this happens when the extraneous body is of a conſiderable bulk, and compreſſes the trachea arteria to ſuch a degree, that the patient is in imminent danger of ſuffocation.

Habicot (Queſtion Chirurgicale ſur la Bronchotomie cap. 16.) in this extremity inſiſts upon the operation being performed as it ought to have been (ſays he) on him, who on a feſtival day, ſwallowed a ſmall bone of a leg of mutton, which remaining in his pharynx, ſuffocated him in the preſence of the phyſicians and ſurgeons, who did not relieve him by this method.

A boy ſwallowed nine piſtoles wrapt up in a linnen cloth, in order to hide them from robbers, but this bundle being too big, ſtopped at the narroweſt part of the pharynx. He was almoſt ſuffocated from the preſſure made on the trachea; his neck and countenance was ſo inflated, that his acquaintance did not know him. Habicot, ſeeing him in ſuch danger, and not able to diſlodge it, performed bronchotomy upon him; this was no ſooner done, than the inflation and livid colour of the neck and face diſappeared. And he made the parcel deſcend into the ſtomach by means of a whalebone probe. Eight or ten days after, the patient at different times, diſcharged the nine piſtoles by ſtool.—This operation may alſo be of another uſe than to make the patient reſpire, and which Habicot does not mention, and that is to open a paſſage for the extraction of bodies which ſlip into the trachea, and are engaged in it.

Haller

Haller tells us in his Pathological Obſervations, that he diſſected a boy who had been ſuddenly choaked by a filberd, which had ſtuck below the glottis, under the inferior ligaments, below the thyroide cartilage, immediately above the orifice of the aſpera arteria. This misfortune, ſays he, might probably have been prevented by bronchotomy, if, when the accident happened, the aſperia arteria had been immediately opened, and ſo the fatal nut taken out with a ſpoon.

The following caſe, though not relievable by ſuch an operation, I mention only as a very extraordinary inſtance of ſuffocation, from the ſame author—A girl of ten years of age, and whoſe only complaint was worms; in diſſecting her, he found the mouth and throat quite full, two of which he alſo found in the aſpera arteria, near the ſeat of the heart, and at the beginning of the lungs.

Our countryman Willis ſeems to have been the firſt, who in ſuch caſes thought of performing the operation of bronchotomy—Willis being once oppoſed in a caſe which required it, the patient died, and he afterwards performed it in the preſence of thoſe who were againſt it, and very eaſily extracted a long and triangular bone.

Heiſter tells us, that he performed it on a young man, by making a longitudinal inciſion, upon the trachea, and then cut through four or five rings longitudinally, and took out a muſhroom.

We are alſo told, that Rauu opened the trachea, in order to extract a bean, which had ſlipped into the larynx.

The obſervations are ſo many, which might be adduced to prove the ſafeneſs of the operation, (and if an operation ſo conſiderable has been performed with ſucceſs in a ſwelling and inflammation of this part, it muſt ſucceed much more ſurely, when it is performed on a ſound part, whoſe functions are only interrupted by the preſence of an extraneous body) that we muſt neceſſarily impute the death of ſuch patients, to the timidity of thoſe called unto their aſſiſtance.

Verdue aſſures us, that this operation was in his time ſucceſsfully performed by a ſurgeon, who was ſo dexterous, as to extract by it a ſmall bone through the opening, after which, the wound of the trachea was ſoon cured. Without this ſpeedy and bold operation, continues he, nothing but death could have been expected.

Let

Let this ſerve us as a caution on ſimilar occaſions, and let us not be ſo cowardly and timorous, as to let a patient die without aſſiſtance; for in caſes of neceſſity every thing is to be riſked.

We now and then meet with wounds of the throat, through which the food eſcapes; we are not for this reaſon always to ſuppoſe, that the æſophagus and trachea are wounded——Theſe wounds paſſing ſometimes only between the glottis and root of the tongue.

Young ſurgeons ſhould know, that a conſiderable and ſudden emphyſema is an occurrence not unuſual in penetrating wounds of the trachea, and this happens when the wound is very ſmall, or that in the trachea is not oppoſite to that of the integuments; owing to which it is that the air inſinuates itſelf into the cellular membrane, not only of the neck, but the head, breaſt, belly, ſcrotum, and even the upper and lower extremities, an inſtance of which I lately ſaw.—I ſhall ſay more of this ſymptom under my reflections upon the lungs.

The bronchial glands are of various ſizes, ſome larger, ſome ſmaller; they are of a blackiſh colour, and are connected by a cellular ſubſtance to the loweſt part of the trachea, and to the diviſions of the bronchia, and are ſuppoſed

poſed to communicate by ſmall openings with the cavity of the bronchia.

The bronchia have their origin from the trachea, and are firſt divided into branches afterwards ſubdivided again, and into almoſt innumerable ramifications: they finally terminate in thoſe ſmall cells or veſicles, which form the greater part of the ſubſtance of the lungs.

In two or three bodies dying of peripneumonies, Dr. Haller found theſe cells loaded with blood, that a great part of the lungs were become quite black, and though the lungs naturally ſwim when put into water, theſe on the contrary ſunk, wherefore, he concludes, that it is not in the veſſels only that the blood of perſons in a peripneumony is congeſted, but that there is a true error loci; and that the blood exhales into the veſicles of the lungs, inſtead of that ſubtle vapour with which they are naturally moiſtened.

Hence we are able to derive a truer idea of the nature of inflammations in general; and that the blood in ſuch caſes is not alone ſhut up within the veſſels of the inflamed part, but that there is an effuſion of it alſo into the cellular membrane——This new, or rather revived theory of inflammations (for he is ſo candid as to ſay, *Hæc eſt antiquiſſima inflamati-*

onis

partly cartilaginous and partly membranous, called trachea or aſpera arteria.

The trachea or aſpera arteria is a tube or canal, extended from the mouth down to the lungs. The larynx or head of the trachea forms the protuberance in the upper and anterior part of the neck, called commonly pomum adami.

It is conſtituted of five cartilages, viz. the cartilago thyroides, which is the anterior and largeſt, cricoides the inferior, and baſis of the reſt; two arytenoides, the poſterior and ſmalleſt; and the epiglottis, which is above all the reſt.

The ventricles or ſacculi, mentioned by the antients and reſtored by Morgagni, (who has given an excellent deſcription of them, and of the whole ſtructure of the aſpera arteria) lie under the glottis, and are formed by a continuation of the internal membrane of the larynx.

The larynx ſerves particularly to admit and let out the matter of reſpiration; and the ſolidity of the pieces of which it is compoſed hinders not only external objects, but alſo any hard thing which we ſwallow, from diſordering this paſſage. The glottis being a

very narrow ſlit modifies the air which we breathe, and as it is very eaſily dilated and contracted, it forms the different tones of the voice, chiefly by means of the different muſcles inſerted in the arytenoide cartilages.

The facility of varying and changing the tone of the voice depends on the flexibility of the cartilages of the larynx, and decreaſes in proportion as we advance in age, becauſe theſe cartilages gradually harden and offify, though not equally ſoon in all perſons.

The general uſe of the epiglottis is to cover the glottis like a penthouſe, and thereby hinder any thing from falling into it, when we eat or drink; and which is ſometimes the caſe when we laugh or talk at the time of ſwallowing.

Haller tells us, that upon tracing the cauſe of low voice, and at laſt an entire loſs of ſpeech in a woman. He found that one half of the epiglottis was covered with an ulcerous tumor here and there eroded, and which he imagined to be the cauſe of the defect in her voice, and was aſtoniſhed that ſhe was not ſuffocated.

The anterior and convex ſide of the larynx is covered with the thyroide gland. The

learned

learned Morgagni has remarked, that this gland is repreſented double by moſt authors, though in reality it is ſingle, and reſembles the moon in its increaſe, the horns pointing upwards.

Euſtachius has very accurately delineated this gland, in his Anatomical Tables, but it is there four times ſmaller than natural.

With regard to its uſe—notwithſtanding the excretory ducts have not been aſcertained, yet it is probable, from its ſituation and connexion with the trachea and æſophagus, that they pour a lubricating fluid into them, and it is not likely, that ſo large a gland upon the trachea ſhould be ſo cloſely connected in that place without ſome uſe.

Tumors very often happen in this gland; but ſuch a ſwelling is not properly a bronchocele, (though ſometimes ſo miſcalled) but a ſtruma.

In morbid bodies this gland has been found enlarged to an extraordinary bigneſs, ſo as to reach down almoſt to the clavicles; and in ſuch caſes they generally turn ſcirrhous; when it is very large, neither any inward medicine nor outward application can diſſolve it. Neither would any prudent ſurgeon, I preſume, attempt

tempt to extirpate ſuch a large tumor, for fear of an hæmorrhage, or wounding the recurrent nerves. And Petit, in his Edit. of Palfin's anatomy, vol. II. chap. ix. p. 313, gives us a ſufficient caution, in telling the ſtory of a daring ſurgeon, whoſe patient in ſuch a caſe expired under his hands, to the great ſcandal of the profeſſion.

There are other ſorts of tumors ſeated in the forepart of the neck, and particularly deſcribed by Albucaſis, and which deſcription I ſhall tranſcribe from Dr. Friend.

In treating of a bronchocele, or a rupture in the forepart of the neck, which he ſays is moſt frequent in women, he is fuller than the Greeks or Celſus; he makes two ſpecies, one like a tumor which contains ſome groſs ſubſtance, the other like an aneuriſm. But tho' he is ſo bold in uſing the knife, he adviſes the operation only in the former caſe; and even not there neither unleſs the tumor be looſe, and little, and encloſed in a cyſtis.

Sometimes theſe excreſcencies are full of water, and ſometimes they have nothing in them but air.

This is a very frequent diſtemper in thoſe countries where they drink great quantities of cold

cold water, eſpecially where they do not cool their waters in ſnow, as in other warm climates; but pour ice into it, as the way is with the ordinary people who live upon the black mountains of Genoa and Piedmont. The matter of fact is as true, as that they themſelves attribute it to the drinking this water; and from the nature of cold, it is not difficult perhaps to account for the effect. And that the coldneſs not only of the liquors, but of the climate itſelf in other countries, may produce the ſame effects, ſeems to be plain, from the obſervations we find in writers, that theſe ſwellings about the throat and head, are more frequent among the northern nations than the ſouthern.

We have ſeveral inſtances of diſeaſes which are peculiar to ſome particular country, and ſeldom known any where elſe. Thus in Europe the plica polonica is proper to the Poles--- the ſcurvy to the borderers upon the Baltic Sea----and the guttur tumidum to ſuch as dwell below the Alps. Thus in Aſia, the vena medinenſis or dracunculus is peculiar to the Arabians. So in Africa, the eliphantiaſis was always the peculiare malum Ægypti, as we learn from Pliny.

The

The following quotation from De la Faye's notes upon Dionis, *des Operations de Chirurgie*, p. 640, will ſhew that a true bronchocele takes place here ſometimes.

" Le Goetre, comme Dionis le remarque, " n'eſt pas une hernie, parce qu'il n'eſt pas " formé de parties déplacées. Mais il ſurvi- " ent quelquefois à la gorge une veritable " hernie qu'on peut appeller proprement bron- " chocele ou hernie de la trachée artére; car " elle eſt formée par le déplacement d'une " partie de la membrane intérieure de ce con- " duit. Cette membrane en ſe dilatant paſſe " entre les anneaux cartilagineux de la tra- " chée artére, et forme a la partie antérieure " du col un tumeur molaſſe, ſans douleur, de " meme couleur que la peau, et qui s'etend " quand on retient ſon haleine. Cette eſpece " de maladie dont M. Muys dans ſes obſerva- " tions, et Manget dans ſes notes ſur Bar- " bette, font mention, eſt fort rare, et nuit " beaucoup a la voix et à la reſpiration."

The aſpera arteria or windpipe, conſiſting of ſemicircular cartilaginous ſegments with their back parts membranous and connected together by ſtrong muſcular ligaments, gives a free ingreſs and egreſs to the air from the glottis which is always open, and lined with a ſmooth lubricated membrane, ſo that

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it will expand circularly by the air, give way to the æſophagus in deglutition, follow the poſture on bending of the neck, and become either elongated or contracted, as there may be occaſion. The whole membrane, which conſtitutes the back of the trachea, where the circular cartilages are deficient, is beſet with ſmall glands, which ſeparate an unctuous humour, diſcharged by their ducts, into the cavity of the trachea.

This canal is lined on the inſide by a fine membrane ſo extremely ſenſible, that nature has placed it as a guard to watch at the door of our breath and life, that we might not be ſuffocated by any particles falling into the trachea; for all bodies irritate it but the pure air; even a drop of clear water excites a convulſive and troubleſome cough, which does not ceaſe till the liquor is ejected. This membrane has ſeveral ſmall ducts (as has been obſerved) opening into it, which continually pour out a mucilaginous fluid, and which is of the greateſt uſe in defending it from being injured by any acrimonious particles that may float in the air.——This mucus, when left long undiſturbed, may become ſo tough and ſolid as to take the form of blood veſſels; which, as Ruyſch juſtly obſerves, has made ſome of the moſt diligent obſervators give us hiſtories of cluſters of veſſels of great bulk being at once

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ejected by coughing, (Tulpius among others has done this with two figures repreſenting, as he thought, the veſſels coughed up) whereas in fact it was only matter inſpiſſated and moulded in the lungs.

If the windpipe be injured even with a large wound, and the air has a free paſſage into the lungs, that wound will not always prove mortal; there are caſes which inconteſtably prove this, in which people being weary of their lives have laid violent hands on themſelves, or in which the throat has been cut by robbers, and yet they have been cured.

There are many who believe all wounds of the trachea mortal, and ſome have declared as much in their writings. But the true ſtate of the caſe is, that when any of the large adjacent blood veſſels are wounded, it is from the injury done to them that the patient dies.

In Heiſter's obſervations, there is an inſtance of a gun-ſhot wound of the trachea cured, and where a piece of the trachea was carried away. *(See ob.* 80.)—and of which, ſays he, as much as I can call to mind, I have not met with an example of in other authors.

Van Swieten remembers a ſoldier who uſed to beg his way, and make a ſhow of a large wound

tionis theoria, quam Galenus propoſuit) he has beautifully confirmed by inſtances deduced from ſome particular caſes of ſurgery, and which you will meet with in the firſt volume of his Elementa Phiſiolog. and further illuſtrated in his Pathological Obſervations.

All the bronchial cells are ſurrounded by a very fine reticular texture of the ſmall extremities of arteries and veins, which communicate every way with each other.

The blood veſſels of the lungs are of two kinds; one common, called the pulmonary arteries and veins; the other proper, called the bronchial artery and vein.

The pulmonary artery goes out from the right ventricle of the heart, and its trunk, having run almoſt directly upwards as high as the curvature of the aorta, is divided into two lateral branches, one called the right, the other the left pulmonary artery.

The right artery paſſes under the curvature of the aorta, and is conſequently longer than the left. They both run to the lungs, and are diſperſed through their whole ſubſtance by ramifications nearly like thoſe of the bronchia.

The pulmonary veins, having been diſtributed through the lungs in the ſame manner, go out on each ſide by two great branches which open laterally into the reſervoir or muſcular bag of the left auricle. Theſe three orders of veſſels, with their courſe and numerous diviſions, will beſt be underſtood by ſeeing ſome preparation of them.

Beſides theſe capital blood veſſels there are two others, called the bronchial artery and vein by Ruyſch, who deſcribed and gave them that denomination, becauſe creeping or ſpreading upon the bronchia, they are extended even to their extremities.

The great veſſels appear deſtined for the circulation of the blood through the lungs. The bronchial veſſels are ſuppoſed to ſerve for their nutrition. For it appears to be a conſtant rule of nature, that the viſcera, which change by their fabric the common humours brought to them for the uſe of the whole body, have ſtill other arteries peculiar to themſelves, which bring the vital blood appointed for their nutrition.

The lungs are the principal organs of reſpiration—hereby it is that parts noxious and redundant are exhaled from the blood, and there-

therefore not improperly defined by ſome the pulmonary tranſpiration.

Reſpiration is alſo neceſſary to facilitate the paſſage of the blood through the lungs, by which means it has the coheſion of its parts broken, attenuated, and pounded as it were. And it is by this force, that the abdomen with all its viſcera are continually compreſſed. By virtue of this, the ſtomach, inteſtines, gall-bladder, receptacle of the chyle, urinary bladder, inteſtinum rectum, and the uterus itſelf, diſcharge their contents; and by this action, the aliments are principally ground or diſſolved, and the blood is urged through the ſluggiſh veſſels of the liver, ſpleen, and meſentery.

We ſhould ſcarce believe that part of the vital viſcera might be amputated when they are expoſed by wounds, if it was not proved ſafe by experience.

We read in Tulpius of a man who received a large wound under his left breaſt, part of the lungs on that ſide protruded through the wound, to the breadth of three fingers, which being neglected, begun to mortify, a ligature was immediately made round it, and then cut off with a pair of ſciſſars, to the quantity of about three ounces, in fourteen days the wound

was healed, and the man ſurvived for ſix years afterwards.

Hildanus likewiſe certifies, that part of the lungs being prolapſed through a wound of the thorax, it was afterwards cut off with a hot inſtrument of ſteel, the patient being afterwards cured.

Nay Celſus formerly boldly pronounced, *Si quid aut ex jocinore, liene aut pulmone duntaxat extremo dependeat, id præcidatur.*

Ruyſch tells us, (ob. 53.) that a ſervant being wounded in the bottom of the fore-part of the thorax into its cavity, a ſurgeon was called, who ſeeing ſomething thruſt out of the wound, immediately made a ſtrong ligature about the whole part that was expelled, thinking it to be a portion of the omentum, and immediately ſent for him into conſultation; but upon hearing him ſay that the wound was not inflicted in the abdomen, but into the cavity of the thorax, and that the part thruſt out, which he had tied with the ligature, was a portion of the lungs, he ſtood like one aſtoniſhed. Things being thus ſtated, Ruyſch adviſed him to leave the wound as it was, till he found that part of the lungs intercepted by the ligature mortified, hoping that

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it would be then ſeparated, and the remainder of the lungs healed in the wound itſelf, which ſo happily ſucceeded, that the patient was cured in a little time after.

There is a ſymptom which is ſometimes an attendant on penetrating wounds of the breaſt and lungs, and of ſo extraordinary a nature, that it will be inexcuſable not to take notice of it. It is the emphyſema, or that amazing inflation which ariſes from the air veſſels of the lungs, being injured by the wound, ſo as to depoſit their injured air into the cavity of the thorax. It appears from medical obſervations, that the air having entered the cellular membrane may pervade almoſt all parts of the body, and produce wonderful tumors, eſpecially as theſe cells are every where open, and form one continuous cavity throughout the whole body, ſo that none of the cellular fabric is excepted from this communication, nay even the vitreous body itſelf of the eye has received the flatus of an emphyſema. We meet with (in the Academ. des Sciences) the hiſtory of a man who was wounded into the thorax, and who, before his death, had his whole body ſurprizingly ſwelled with one of theſe kind of tumors, excepting the ſoles of his feet and the palms of his hands; upon the thorax the tumor was eleven inches thick, and upon the abdomen nine, the eyes in this

ſubject were in a great meaſure thruſt out of their orbits, from the cellular membrane being diſtended with a great quantity of air.

There is another caſe of this kind in the ſame work, of a fatal emphyſema, from a fracture of the ribs, the ſkin remaining entire.

Wherever ſuch inflations are found, the curative indication directs to diſcharge the elaſtic matter from the cellular membrane which it diſtends.—Parey gives us a fair inſtance of the ſucceſs of ſcarification in a caſe of this nature. For while the miſerable patient was given over by every one, a ſkilful ſurgeon (he ſays) boldly perforated the ſkin with a great many very deep ſcarifications, and thereby diſcharged the included air, ſo that the patient was reſtored to his health, and in a manner ſnatched from death.

The like tumors ariſe from a putrefaction of the extravaſated humours, ſince it is evident from experience, that putrefaction will produce or extricate the elaſtic matter which lay concealed in bodies, and which, if it is not real air, has at leaſt the ſame elaſtic power, by which it will expand greatly by heat.

The air dilating itſelf in the blood after death occaſions various motions. Haller ſays, that

that he has ſeen the blood in the heart of a young man filled with air, to reſolve itſelf into froth and to diſcharge itſelf from the opening he made in the heart. He adds, that he has alſo ſeen the blood diſcharge itſelf from the mouth of a very fine woman who died in child-bed, ſo as to fill the ſhroud.

There are many caſes of this nature; and perhaps this is the only cauſe of the bleeding in dead people, which the ſuperſtition of the ancients hath regarded as an index of divine vengeance, which diſcovered the criminal by this bleeding his preſence had created in the body of the perſon he had deprived of life.

To return to our reflexions upon the lungs —Should a large abſceſs in this part break ſuddenly, ſo that the matter cannot be diſcharged ſlowly, and in a ſmall quantity at a time, by coughing, but vents itſelf at once in a violent flood into the windpipe, ſo as to fill it, there will be no paſſage left for the admiſſion of the air; whence ſudden death.— I ſaw two unhappy inſtances of this not long ſince.

Sometimes the abſceſs burſting, the matter falls into the cavity of the breaſt, and this with a fatal event, unleſs there is a paſſage made

made for its diſcharge by a timely aperture into the thorax.

Boerhaave ſaw, he tells us, in the body of one who expired of a ſuppuration in the thorax, that the lungs on one ſide were converted into a ſack-full of matter, of ſuch a prodigious bulk, that it not only diſplaced the heart from its ſituation, and compreſſed the lungs into a ſmall compaſs, but likewiſe thruſt down the diaphragm, and made it protuberate into the abdomen.

Haller likewiſe ſaw a moſt terrible diſorder of this part, in a body which he opened—The lungs on the left ſide were not to be found, but inſtead of them, a large quantity of matter; the aſpera arteria (which if himſelf had not ſeen, he ſhould ſcarce have believed) and the larger arteries and veins opened with wide orifices into the cavity of the thorax, as if they had been cut through, ſo that it was very hard to diſcover what it was that prevented the efflux of the blood.

As the lungs from an inflammation often adhere to the contiguous parts, the abſceſs may break outwardly; which would prove a good effect, though from a bad cauſe.

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We are taught by morbid diſſections, that the matter has eat through the diaphragm, and even into the ſtomach itſelf; I have ſeen where it has got from the lungs through the diaphragm and into the liver.

Though the principal ſeats of calculi are the urinary or gall bladders, yet hiſtory ſhews us, that ſcarce any part of the human body are excepted from ſtony concretions, not even that organ we have now been deſcribing.

The great Boerhaave relates, that the famous Botaniſt Vaillant ſpit up four hundred ſtones from his lungs, and that he has ſeen aſthmas of the worſt kind, where calculi have been brought up from the windpipe, when the reſpiration would be free till more calculi were formed.

Kerckringius (in his Spicelegium Anatom.) has a caſe of this kind to which he has ſubjoined the figure of the calculi adhering to the bronchia.

Le Dran tells us, that he knew two inſtances, where they were often diſcharged by expectoration.

There ſtill remains another intereſting remark to make upon this part. Every one has

heard of the experiment upon the lungs made to discover whether an infant has died before or after the birth.

It is the common opinion, that to be convinced of the truth in this case, we ought to put a piece of the infant's lungs into the water, and if it swims, it is a proof that it has breathed, and consequently been alive.

Though this experiment appears convincing to absolve or condemn persons accused of destroying their children, yet it is proved, by many facts, that it is not so infallible as it is imagined.

The lungs of a child, dead before its birth, sometimes swim in water. This happens when, immediately after its birth, we blow into its mouth, as sometimes midwives do, when they doubt whether the child is really dead.

We meet with an example (in the Norimberg Transactions) by a physician; where, he says, the child was certainly born dead, whose body was not dissected, till it was considerably putrified; its vessels were full of air, and vesicles, distended with it, were seen on the lungs; pieces of the lungs swam when put into water.

Hence

Hence we may see how great the uncertainty of this experiment is, and how cautious we ought to be, when we examine the bodies of infants, in order to make a report to a court of judicature: upon this head, *see Bohnius, de renunciatione vulnerum, dissert. de infanticidio, pag.* 171.

F I N I S.